Discussion of the Amendments

Claim 1 has been amended to recite a method of planarizing or polishing "a surface" of a memory or rigid disk as suggested by the Examiner. No new matter has been added by way of this amendment. The precise amendments to the claim, as well as the pending claims as amended, are set forth on separate attachments hereto.

Summary of the Office Action

Claims 1-23 have been rejected as allegedly indefinite under 35 U.S.C. § 112, second paragraph. Claim 24 has been rejected as allegedly anticipated under 35 U.S.C. § 102(e) by Huynh et al. (i.e., U.S. Patent 6,190,237). Claims 1-14, 17-23, and 25-34 have been rejected as allegedly unpatentable under 35 U.S.C. § 103(a) over Huynh et al. in combination with James et al. (i.e., U.S. Patent 6,069,080). Claims 15 and 16 have been rejected as allegedly unpatentable under 35 U.S.C. § 103(a) over Huynh et al. and James et al. in further combination with Ishitobi et al. (i.e., U.S. Patent 6,152,976).

Discussion of the Indefiniteness Rejection

The rejection of claims 1-23 is moot in view of the amendment to claim 1. Specifically, claim 1 has been amended to recite a method for planarizing or polishing "a surface of a memory or rigid disk" as suggested by the Examiner, thus resolving the issue of proper antecedent basis. Accordingly, the indefiniteness rejection of claim 1, and claims 2-23 dependent thereon, should be withdrawn.

Discussion of Anticipation Rejection

The anticipation rejection of claim 24 is moot in view of the cancellation of the claim.

Discussion of Obviousness Rejection

Claims 1-23 and 25-34 have been rejected as allegedly obvious over the combination of Huynh et al. and James et al. in further combination with Ishitobi et al. Applicants respectfully traverse the rejection of claims 1-23. The obviousness rejection of claims 25-34 is moot in view of the cancellation of those claims.

Discussion of Huynh et al.

Huynh et al. discloses a polishing composition for polishing a semiconductor substrate. The polishing composition comprises an acid and/or salt thereof in combination with a base and/or salt thereof which form a buffer that resists changes in pH that can result from the presence of residual polishing composition from an earlier polishing step. The

concentration of acid and base compounds in the buffer is 0.0001 M to 100 M with a preferred range of 0.01 M to 0.1 M.

In view of the disclosure of Huynh et al., one of ordinary skill in the art, in order to arrive at the claimed invention, would have to (a) select a phosphate compound from among the list of possible choices to serves as a buffer component, (b) select an amount of that phosphate compound that was about 0.04 M or higher, and (c) select a memory disk as the substrate to be polished. However, there is nothing in Huynh et al. that would teach or suggest to one of ordinary skill in the art to properly make the three selections, as discussed in more detail below.

a. Selection of Buffer Component

Only 4 (e.g., about 15%) of the 27 acid and base compounds disclosed in Huynh et al. as suitable for inclusion in the buffer component comprise phosphate ions (i.e., phosphoric acid, potassium dihydrogen phosphate, disodium hydrogen phosphate, and trisodium phosphate). Huynh et al. provides no teaching or suggestion that would lead one of ordinary skill in the art to select a phosphate over the other available choices. In fact, Huynh et al. teaches against the selection of a phosphate ion by disclosing that the combination of acetic acid and ammonium hydroxide (col. 3, lines 29-32) is the preferred acid/base combination.

b. Selection of Buffer Component Concentration

Huynh et al. teaches a broad concentration, covering 7 orders of magnitude, along with a narrower range of 0.01 M to 0.1 M, of the concentration of acid and base compounds in the buffer. The concentration ranges encompass the entire spectrum of acid and base compounds disclosed in Huynh et al. However, Huynh et al. provides no teaching or suggestion that would lead one of ordinary skill in the art to use a sufficient amount of a compound to yield 0.04 M or higher phosphate ion.

The Office Action asserts that the claimed concentration range of 0.04 M or higher would be achieved through "routine optimization." The acid and base compounds, which have a wide range of pK_a values (i.e., from 2 to 11), can be combined in varying amounts to produce buffer solutions having a wide range of pH values (i.e., about 3 to less than 11; col. 2, lines 21-22). The concentration of the acid and base in the buffer component determines the capacity and pH of the buffer. Based on the teachings of Huynh et al., one or ordinary skill in the art would set out to optimize the buffer properties of the polishing composition by selecting the ideal combination of acid and base components to obtain a buffer with the greatest buffer capacity at the desired buffer pH such that the combination of acid and base does not affect the polishing rate, in accordance with the explicit teaching of Huynh et al.

(see, e.g., col. 4, lines 18-20). Such optimization, therefore, would cause the ordinarily skilled artisan to be led away from the claimed range of 0.04 M or higher phosphate ion when the substrate to be polished is a memory or rigid disk, since the claimed range produces an increase in the polishing removal rate (as taught in the present patent application) with respect to the polishing of a memory or rigid disk.

c. Selection of Substrate

Huynh et al. discloses a polishing composition for use in polishing a semiconductor substrate and states that the composition "can also be used for other substrates" (col. 1, lines 8-9). Huynh et al. provides no teaching or suggestion that would lead one of ordinary skill in the art to use any particular polishing composition to polish a memory or rigid disk as opposed to any other substrate. Indeed, if anything, an ordinary artisan would use the disclosed polishing composition to polish a semiconductor substrate, as opposed to any other substrate, inasmuch as Huynh et al. focuses only on semiconductor substrates. Moreover, Huynh et al. teaches that the polishing composition comprising the buffer component does not affect the polishing rate of the substrate (see, e.g., col. 4, lines 18-20). Thus, one of ordinary skill in the art would be motivated to select "other substrates" that, like semiconductor substrates, have removal rates that are unaltered by the presence of the components of the buffer. Thus, a selection of the class of substrates including memory or rigid disks would be contrary to the teaching of Huynh et al.

Thus, contrary to the assertion of the Office Action, there is no teaching or suggestion in the disclosure of Huynh et al. that would direct one of ordinary skill to select an acid or base to provide phosphate ions, utilize a sufficient amount of the acid or base to yield 0.04 M or more phosphate ions, and then use that polishing composition to polish a memory or rigid disk. Absent any teaching to make the proper choices, one of ordinary skill in the art could not arrive at the claimed invention without the benefit of the hindsight knowledge of the present patent application. In fact, by following the teachings of Huynh et al., one of ordinary skill in the art would be led away from the invention as recited in the pending claims.

Discussion of James et al.

James et al. discloses a fixed abrasive polishing pad to be used in conjunction with an aqueous fluid for polishing a semiconductor or a memory disk substrate. James et al. suggests that the fluid preferably comprises a pH modifier and optionally a pH buffer, surfactant, chelating agent, and/or oxidizer. James et al. does not provide any teaching

regarding the use of specific polishing fluids with particular substrates (i.e., semiconductor vs. memory disk). Moreover, James et al. does not suggest that the same aqueous fluids can be used for both classes of substrates. Rather, one of ordinary skill in the art upon reading the disclosure of James et al. would recognize that it is only the polishing pad itself which is suitable for both semiconductor and memory disk substrates and that the actual components present in the aqueous fluid depend on the type of substrate being polished (thus the reason the polishing fluid components are all optional in accordance with the disclosure of James et al.). Thus, the disclosure of James et al. alone falls well short of suggesting a polishing composition comprising an oxidizer, a phosphate ion or phosphonate ion, and an abrasive for polishing memory or rigid disks as recited in the pending claims.

Discussion of Combination of Huynh et al. and James et al.

The combination of Huynh et al. with James et al. still fails to support a *prima facie* obviousness rejection of the invention recited in the pending claims.

Huynh et al. is deficient in that it fails to teach or suggest (a) the selection of a phosphate ion acid or base buffer component, (b) the selection of a concentration of phosphate ion of 0.04 M or higher, and (c) the selection of a substrate that is a memory or rigid disk. The Office Action alleges that the disclosure of James et al. suggests the use of a polishing composition, supposedly like that disclosed by Huynh et al., could be used in polishing memory disk substrates.

Contrary to the assertion of the Office Action, the disclosure of James et al. fails to provide any guidance regarding any of the three selections discussed above, which are necessary to yield the invention as recited in the pending claims. James et al. discloses the optional incorporation of buffer component in the polishing composition, but does not specify any particular type of buffer or any particular concentration of the acid or base components contained therein. As regards the choice of substrate to be polished with the polishing composition, the disclosure of James et al. merely suggests that the fixed abrasive polishing pad can be used with either semiconductor or memory disk substrates. James et al. does not suggest that a polishing composition that is useful for one type of substrate would be useful for the other. Thus, James et al. does not provide any teaching to support an obviousness argument regarding the use of the polishing composition taught by Huynh et al., let alone a polishing composition as recited in the pending claims, for any type of substrate other than semiconductors. Moreover, even if one were to combine the disclosures of Huynh et al. with James et al., the explicit teaching of Huynh et al. that the buffer component does not affect the polishing rate of the substrate would lead one of ordinary skill in the art away from the claimed invention.

Discussion of Ishitobi et al.

Ishitobi et al. fails to satisfy the deficiencies of Huynh et al. and James et al., either alone or in combination. Ishitobi et al. discloses a polishing composition for a magnetic disk comprising titanium oxide abrasive and an abrasion promoter. Nothing in the disclosure of Ishitobi et al. suggests the solution of a phosphate ion acid or base component, particularly the use of such a component to achieve a phosphate ion concentration of about 0.04 M or higher, for polishing a memory or rigid disk.

Since the cited references do not teach or reasonably suggest the invention as recited in the pending claims, the obviousness rejection over Huynh et al. in combination with James et al., and even further in combination with Ishitobi et al., is not proper and should be withdrawn.

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

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Date: March 20, 2002

CERTIFICATE OF MAILING

I hereby certify that this RESPONSE TO OFFICE ACTION (along with any documents referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231.

Date: March 20, 2002

PATENT
Attorney Docket No. 99154X204201

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Fang et al.

Application No. 09/595,227

Art Unit: 3723

Examiner: H. Shakeri

Filed: June 16, 2000

For: METHOD FOR POLISHING A MEMORY OR RIGID DISK WITH A PHOSPHATE ION-CONTAINING POLISHING SYSTEM

AMENDMENTS TO CLAIMS
MADE IN RESPONSE TO OFFICE ACTION DATED FEBRUARY 15, 2002

1. (Amended) A method for planarizing or polishing [the] a surface of a memory or rigid disk comprising abrading at least a portion of the surface with a polishing system comprising (i) a polishing composition comprising water, an oxidizing agent, and about 0.04 M or higher phosphate ion or phosphonate ion, and (ii) abrasive material.

24. cancelled

25. cancelled

26. cancelled

27. cancelled

28. cancelled

29. cancelled

30. cancelled

31. cancelled

32. cancelled

33. cancelled

34. cancelled